# Village Water Tank Inspection for FLARE Purge Studies

*Terry Tope 4/12/06*

# *Village Tank Inspection – 4/11/06*

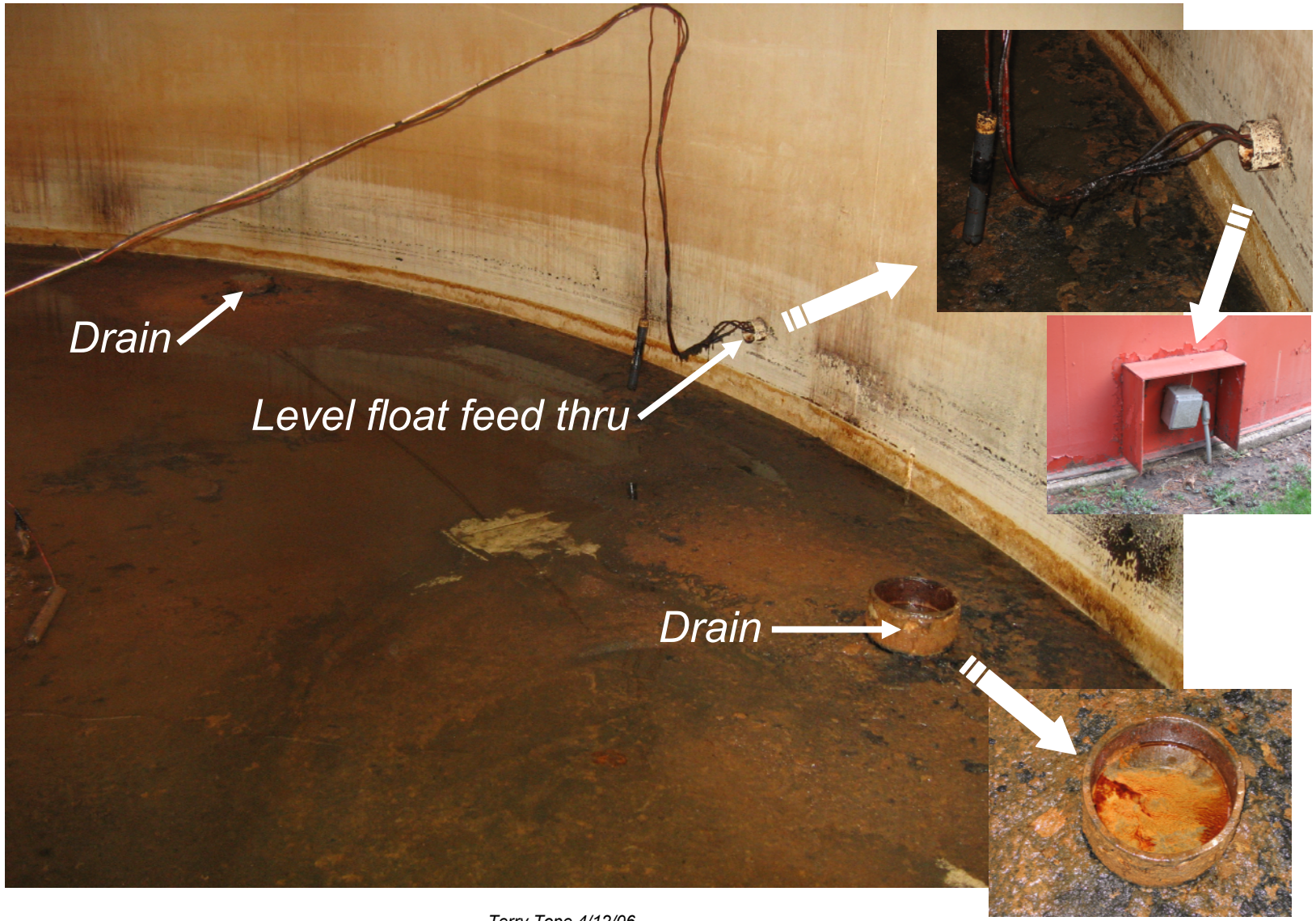
- *Most of the tank water was pumped out by FESS prior to arrival.*
- *Rich Schmitt and Terry Tope entered the tank, following a confined space procedure. Outside the tank were Dave Pushka, John Voirin, Eric McHugh.*
- *Portable halogen lights with GFI plus sunlight illuminated the tank.*

# *Village Tank Inspection – 4/11/06*

- *The tank floor is crowned in the middle and settled around a 15 foot radius.*
- *The rope and float system is nylon or polypropylene and attached to hooks on the wall. It can easily be cut off. It also has several wires leading out through a four inch penetration near the floor.*

# *Village Tank Inspection - 4/11/06*

- *There are two eight inch pipe floor drains.*



# *Village Tank Inspection – 4/11/06*

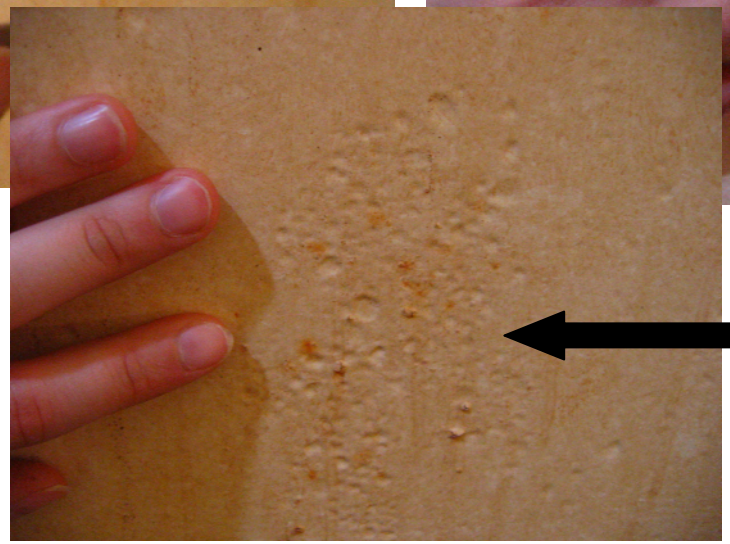
- *The slimy silt on the floor varies from zero to two inches deep. An average might be ½ inch deep.*
- *The floor condition appears to be excellent under the silt.*


# *Village Tank Inspection – 4/11/06*

- *The walls are in good condition, with a few small rusty spots.*
- *A little of the dried silt on the wall can be rubbed off by hand, but it will take a brush and detergent to get most of it.*

*Good condition!*

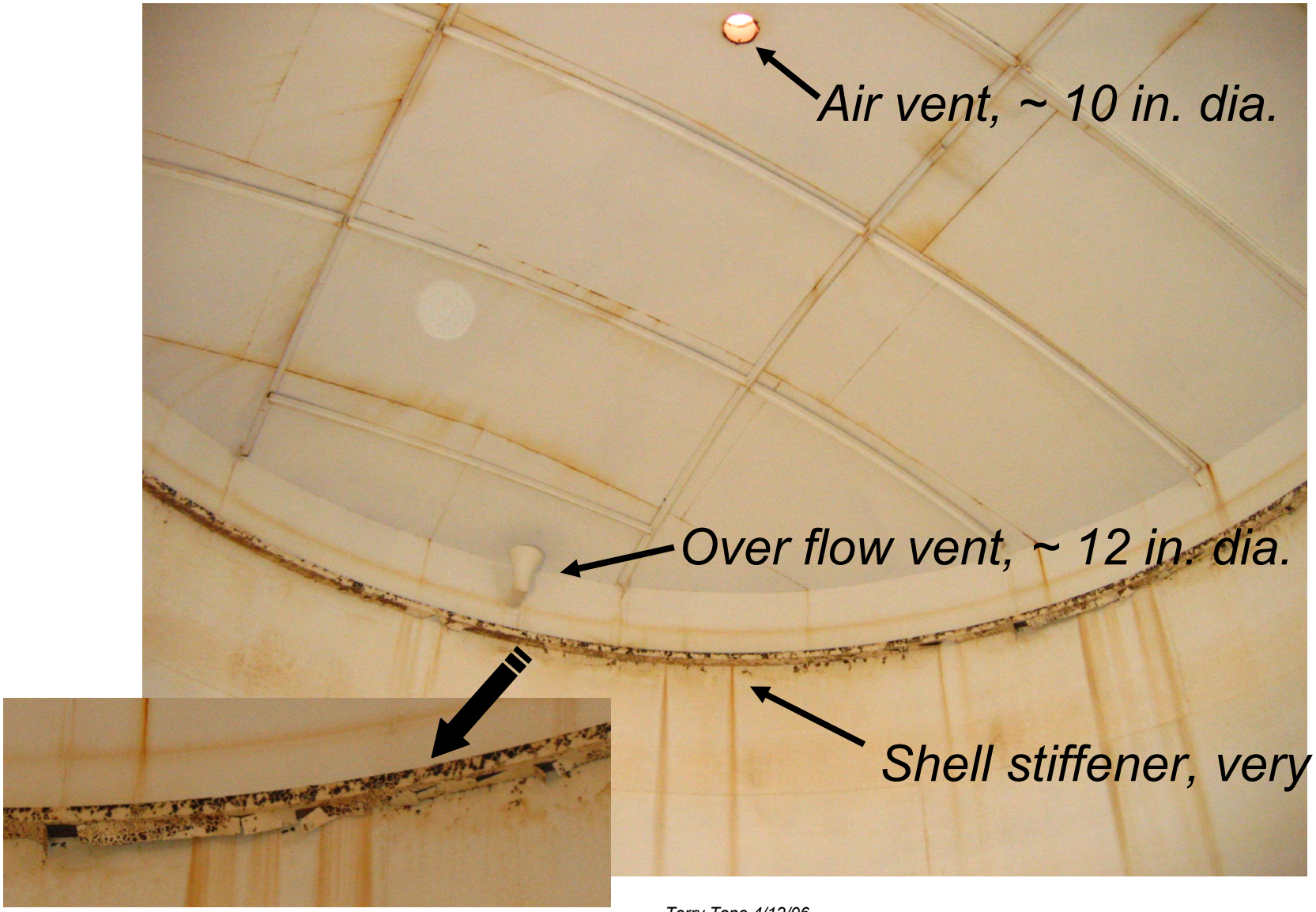
*Rust*



*Surface pitting painted over*

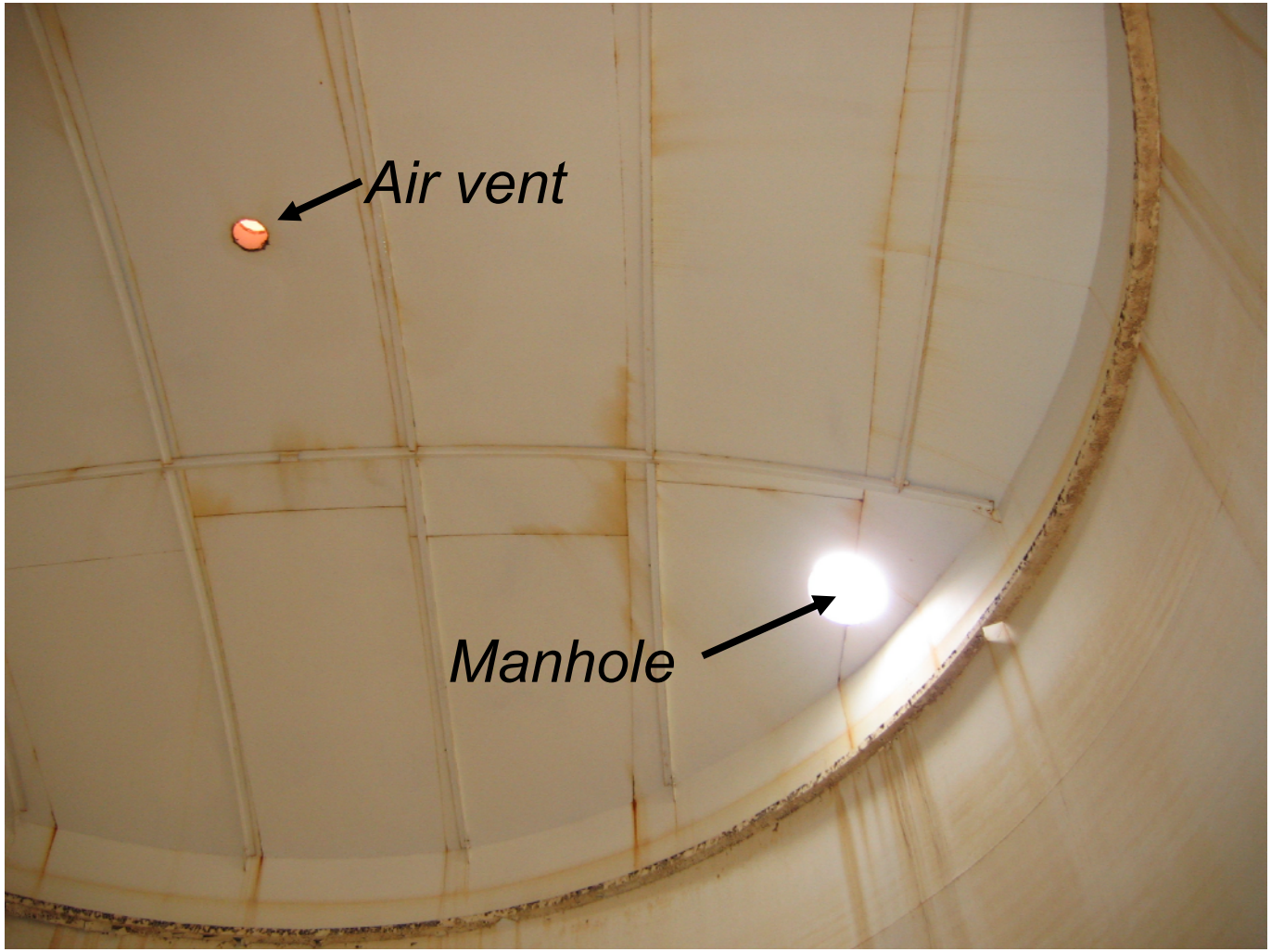
# *Village Tank Inspection – 4/11/06*

- *The roof is framed and apparently has lapped plates.*



# *Village Tank Inspection – 4/11/06*

- *The roof leaks at most seams and has left rusty streaks on the walls.*
- *No sunlight or rusty streaks were visible at the roof to shell joint.*



# *Village Tank Inspection – 4/11/06*

- *Additional observations*
  - *There are no anchor bolts.*
  - *Outside the tank the ground slopes gently toward the southeast.*
  - *The old pump house sumps are covered with concrete.*
  - *With both the side and top manholes open and windy conditions there is a strong air flow into the tank.*
  - *The side manhole was bolted shut, the top was left open.*

# *Village Tank Inspection – 4/11/06*

- *Tank Dwellers*

# *Tasks and questions*

- *Remove ropes and floats*
  - *Disconnect electrical power if not already done. Wires are accessible outside the tank in an electrical box.*
  - *Cut electrical wires and float ropes and discard.*
- *Clean the floor*
  - *Sweep and shovel the silt out of the tank*
  - *Rinse the floor, pumping out water.*
- *Wash the walls*
  - *Bring a fire hose in from a nearby hydrant*
  - *Knock the loose paint from the stiffener*
  - *Rinse the entire walls and the floor.*
  - *Pump out the rinse water.*
  - *With silt wet, brush the walls with long-handled brushes.*
  - *Call some industrial tank cleaners for prices.*

# *Tasks and questions*

- *Close openings*
  - *Eight inch pipe caps on floor drains, weld closed.*
  - *Four inch pipe cap on level meter, weld closed or convert to instrumentation feed thru.*
- *Measure wall/roof thickness with ultrasonic testor*
- *Measure air vent dimensions and create exhaust scheme*
- *Should the roof leaks be repaired?*
  - *Do small leaks between lapped plates interfere with purge?*
  - *Should the roof joints be tarred?*

# *Tasks and questions*

- *Create scheme for even gas introduction*
  - *1st estimate is 5200 ft^3/hr flowrate*
  - *A "rise speed" of 4 ft/hr*
  - *A volume change every 7.7 hours*
- *Make sure tank cannot be over pressurized by gas delivery system*
- *Work with Zhijing on a CFD model*
  - *See how single tank outlet at top works*
  - *Investigate tank thermal gradient mixing effects*
- *Instrumentation*
  - *O2 monitors inside tank, how many?, locations?, how to mount?*
  - *Ordered O2 monitor that is $60 in qty > 10 for testing*
  - *Use the already purchased 0-5000 ppm O2 monitor at the exhaust*
  - *Temperature probes, how many?, locations?*
  - *Dewpoint meter?*
  - *DAQ, likely purchase USB based system*
  - *Create instrumentation feed thru*

# *Tasks and questions*

- *Use FNAL owned liquid nitrogen trailer to supply N2 gas for 1st test*
  - *Allows for a complete system test before more expensive Argon gas is used*
  - *A "harder" purge test without the density advantage of Argon*
- *Devise scheme to refill tank with air*
  - *Could use a fan at the bottom to blow argon out the stop at a known flow rate*
- *Rent LAr trailer from vendor*
  - *3000 gallon trailer would supply about 8.5 volume changes*